



Figure M-9. Geographical Distribution of the Low-Income Population Residing Within 80 km (50 mi) of Proposed Facilities at SRS

individuals comprising the population. Nonradiological risks to the general population are also small regardless of the racial and ethnic composition or economic status of the population. Thus, disproportionately high and adverse impacts on minority and low-income populations residing near the various facilities are not likely to result from implementation of the proposed action or alternatives.

## **M.6 RESULTS FOR TRANSPORTATION ROUTES**

Table M-5 shows minority populations residing along 1.6-km (1-mi) corridors centered on routes that are representative of those that could be used for the transportation of nuclear materials under the proposed action or alternatives. Table M-6 shows similar data for low-income populations. Population data for Tables M-5 and M-6 were extracted from Tables P-12 and P-121 of the STF-3A files (DOC 1992). Distances from a given origin to a given destination are similar but not identical to corresponding distances shown in Appendix L. This is because distances listed in Appendix L were calculated with the HIGHWAY computer code, while distances shown in Tables M-5 and M-6 were obtained from a Geographical Information System analysis using TigerLine data and STF3A files prepared by the Census Bureau. Both techniques use block group spatial resolution, and the differences are generally less than 5 percent.

Total and minority populations residing in the highway corridors are listed in Columns 4 and 5, respectively, of Table M-5. Column 6 shows minority populations residing within highway corridors as a percentage of the total population. Although total and minority populations residing within the corridors generally tend to increase with increasing distance, the relationship is clearly route dependent.

As discussed in Appendix L of the SPD EIS, implementation of the proposed action or alternatives would not result in significant radiological or nonradiological risks to populations residing along highway transportation routes. Although the percentage minority or low-income populations residing along highway routes can vary by as much as a factor of four, results of the analysis presented in Chapter 4 are independent of the racial and ethnic composition of populations within the corridors, as well as the economic status of populations at risk within the corridors. Implementation of the proposed action or alternatives is not likely to result in disproportionately high and adverse effects on minority or low-income populations residing within representative transportation corridors.

**Table M-5. Minority Populations Residing Along Transportation Routes for Surplus Plutonium**

Origin	Destination	Distance (km)	Total Population Along Route	Minority Population Along Route	Percentage Minority Population Along Route
ANL-W	Hanford	1,035	82,418	9,356	11.4
ANL-W	Pantex	2,395	281,386	82,566	29.3
ANL-W	SRS	3,756	580,985	122,415	21.1
Fuel fabrication	Hanford	4,760	601,233	95,417	15.9
Fuel fabrication	INEEL	4,092	556,388	88,331	15.9
Fuel fabrication	LANL	3,201	506,962	126,460	24.9
Fuel fabrication	Pantex	2,563	430,359	87,635	20.4
Fuel fabrication	SRS	578	75,050	30,702	40.9
Hanford	Geological repository	1,888	248,006	31,424	12.7
Hanford	INEEL	949	74,624	8,927	12.0
Hanford	LANL	2,515	276,768	71,860	26.0
Hanford	ORR	3,993	434,235	62,000	14.3
Hanford	Pantex	3,040	342,903	92,151	26.9
INEEL	ORR	3,316	389,496	59,174	15.2
INEEL	SRS	3,702	574,433	123,656	21.5
LANL	ANL-W	1,868	230,510	60,265	26.1
LANL	INEEL	1,840	227,759	65,563	28.8
LANL	LLNL	1,218	454,603	224,303	49.3
LANL	Pantex	647	85,252	35,326	41.4
LANL	SRS	2,779	521,907	163,376	31.3
LLNL	Fuel fabrication	4,838	771,701	257,880	33.4
LLNL	Geological repository	1,140	414,432	192,001	46.3
LLNL	Hanford	1,428	380,755	50,764	13.3
LLNL	INEEL	1,559	373,040	72,575	19.5
LLNL	Pantex	2,302	476,701	226,661	47.5
LLNL	SRS	4,395	856,464	403,622	47.1
Pantex	Geological repository	1,986	186,981	66,118	35.4
Pantex	INEEL	2,365	293,805	85,783	29.2
Pantex	ORR	1,753	245,038	59,671	24.4
Pantex	SRS	2,165	441,441	126,441	28.6
Pantex	WIPP	538	121,377	37,477	30.9
Portsmouth, OH	Fuel fabrication	977	239,221	40,636	17.0
RFETS	Hanford	1,848	141,585	23,178	16.4
RFETS	INEEL	1,170	104,960	17,791	17.0
RFETS	Pantex	1,252	252,177	81,450	32.3
RFETS	SRS	2,954	540,944	123,248	22.8
SRS	Hanford	4,377	615,204	126,016	20.5
SRS	ORR	568	109,074	15,614	14.3

**Key:** ANL-W, Argonne National Laboratory-West; LANL, Los Alamos National Laboratory; LLNL, Lawrence Livermore National Laboratory; ORR, Oak Ridge Reservation; RFETS, Rocky Flats Environmental Technology Site; WIPP, Waste Isolation Pilot Plant.

**Table M-6. Low-Income Populations Residing Along Transportation Routes for Surplus Plutonium**

Origin	Destination	Distance (km)	Total Population Along Route	Low-Income Population Along Route	Percentage Low-Income Population Along Route
ANL-W	Hanford	1,035	82,418	10,016	12.2
ANL-W	Pantex	2,395	281,386	44,102	15.7
ANL-W	SRS	3,756	580,985	60,473	10.4
Fuel fabrication	Hanford	4,760	601,233	61,518	10.2
Fuel fabrication	INEEL	4,092	556,388	55,229	9.9
Fuel fabrication	LANL	3,201	506,962	73,801	14.6
Fuel fabrication	Pantex	2,563	430,359	64,909	15.1
Fuel fabrication	SRS	578	75,050	10,673	14.2
Hanford	Geological repository	1,888	248,006	28,699	11.6
Hanford	INEEL	949	74,624	9,468	12.7
Hanford	LANL	2,515	276,768	42,384	15.3
Hanford	ORR	3,993	434,235	42,696	9.8
Hanford	Pantex	3,040	342,903	53,293	15.5
INEEL	ORR	3,316	389,496	39,171	10.1
INEEL	SRS	3,702	574,433	61,713	10.7
LANL	ANL-W	1,868	230,510	35,476	15.4
LANL	INEEL	1,840	227,759	35,984	15.8
LANL	LLNL	1,218	454,603	59,814	13.2
LANL	Pantex	647	85,252	12,635	14.8
LANL	SRS	2,779	521,907	80,398	15.4
LLNL	Fuel fabrication	4,838	771,701	103,519	13.4
LLNL	Geological repository	1,140	414,732	48,663	11.7
LLNL	Hanford	1,428	380,755	38,761	10.2
LLNL	INEEL	1,559	373,040	34,078	9.1
LLNL	Pantex	2,302	476,701	62,602	13.1
LLNL	SRS	4,395	856,464	136,322	15.9
Pantex	Geological repository	1,986	186,981	30,207	16.2
Pantex	INEEL	2,365	293,805	46,898	16.0
Pantex	ORR	1,753	245,038	44,137	18.0
Pantex	SRS	2,165	441,441	68,339	15.5
Pantex	WIPP	538	121,377	26,269	21.6
Portsmouth, OH	Fuel fabrication	977	239,221	33,268	13.9
RFETS	Hanford	1,848	141,585	15,985	11.3
RFETS	INEEL	1,170	104,960	10,424	9.9
RFETS	Pantex	1,252	252,177	41,478	16.4
RFETS	SRS	2,954	540,944	58,752	10.9
SRS	Hanford	4,377	615,204	65,311	10.6
SRS	ORR	568	109,074	13,061	12.0

**Key:** ANL-W, Argonne National Laboratory-West; LANL, Los Alamos National Laboratory; LLNL, Lawrence Livermore National Laboratory; ORR, Oak Ridge Reservation; RFETS, Rocky Flats Environmental Technology Site; WIPP, Waste Isolation Pilot Plant.

## **M.7 RESULTS FOR THE REACTOR SITES**

### **M.7.1 Minority and Low-Income Population Estimates**

Table M-7 shows total populations, minority populations, and percentage minority populations that resided within 80 km (50 mi) of the various sites at the time of the 1990 census. The 80-km (50-mi) distance defines the radius of potential radiological effects for calculations of radiation dose to the general population. Table M-8 shows similar data for projected populations in 2015. As discussed in Appendix M.4, minority populations residing in potentially affected areas in 1990 were adopted as a baseline. Populations in 2015 were then projected from the baseline data under the assumption that percentage changes in the majority and minority populations residing in the affected areas will be identical to those projected for State populations. The Census Bureau estimates that the national minority percentage will increase from approximately 24 percent in 1990 to nearly 34 percent by 2015 (Census 1996). [Text deleted.] In Tables M-7 and M-8, the sum of percentages of the different populations may total slightly more or less than 100 percent due to roundoff.

Table M-9 illustrates the uncertainties in the population estimates for the year 2015 due to the partial inclusion of block groups within the boundaries of potentially affected areas. Column 2 of the table lists the number of block groups that are partly within the circle of 80-km (50-mi) radius centered at the various facilities. Column 3 shows the number of block groups that lie completely within the circle. Potentially affected areas surrounding all three of the proposed reactor sites include two States. Columns 2 and 3 show the number of partial or total inclusions for the affected States. Column 4 of the table, denoted as “T/P,” shows the number of totally included block groups divided by the number of partially included block groups. In order to minimize the uncertainties in the population estimate, it is desirable that this ratio be as large as possible. Column 5 shows upper bounds for the estimates of the total population listed in column 6. As discussed above, upper bounds were obtained by including the total population of all block groups that lie at least partially within the affected area. Lower bounds for the estimate of total population shown in column 7 were obtained by including only the populations of totally included block groups. Analogous statements apply to columns 8 through 10.

As would be expected from the value of T/P shown in column 4, uncertainties in the total population estimate for McGuire were the smallest among the three proposed reactor sites (+3.7 percent and -2.4 percent), as were the uncertainties in the estimate of the minority population at risk near Catawba (+5.7 percent and -3.3 percent). Uncertainties in the population estimates for North Anna were the largest among the three sites (+6.5 percent and -4.5 percent for total population; +5.9 percent and -4.2 percent for minority population). None of the uncertainties shown in Table M-9 are large enough to noticeably affect the conclusions regarding radiological health effects or environmental justice.

An estimate of the percentage of low-income persons living within 80 km (50 mi) of the proposed reactor sites in 2015 was obtained using a linear projection of low-income data from the 1980 census and the 1990 census. In 1990, the percentage of low-income persons (i.e., those with reported incomes below the poverty threshold) residing in the contiguous United States was 13.1 percent. The percentage of low-income persons living within 80 km (50 mi) of the proposed reactor sites was lower than the national average in every case. Around Catawba, the percentage of low-income persons living within 80 km (50 mi), in 1990, was 10.5 percent. At McGuire, the percentage was 9.8 percent, and around North Anna, the percentage was 6.9 percent.

The estimated number of low-income persons living within 80 km (50 mi) of Catawba in 2015 is 157,477 or 7.0 percent of the projected population. The estimated number of low-income persons living within 80 km (50 mi) of McGuire in 2015 is 171,182 or 6.6 percent of the projected population. The estimated number of

**Table M-7. Racial and Ethnic Composition of Minority Populations Residing Within 80 km of Proposed Reactor Sites in 1990**

Reactor Site	Total Pop.	Minority Pop.	Percent Minority Pop.	Asian or Pacific Islander Pop.	Percent Asian or Pacific Islander Pop.	Black Pop.	Percent Black Pop	Hispanic Pop.	Percent Hispanic Pop.	Native American Pop.	Percent Native American Pop.	Other Race	Percent Other Race Pop.	White Pop.	Percent White Pop.
Catawba	1,519,392	315,089	20.7	10,942	0.7	288,382	19.0	10,666	0.7	5,098	0.3	442	0.0	1,203,861	79.2
McGuire	1,738,966	305,717	17.6	12,007	0.7	275,789	15.9	12,094	0.7	5,828	0.3	479	0.0	1,432,770	82.4
North Anna	1,286,156	281,652	21.9	18,783	1.5	241,619	18.8	17,550	1.4	3,686	0.3	947	0.1	1,003,557	78.0

**Table M-8. Projected Racial and Ethnic Composition of Minority Populations Residing Within 80 km of Proposed Reactor Sites in 2015**

Reactor Site	Total Pop.	Minority Pop.	Percent Minority Pop.	Asian or Pacific Islander Pop.	Percent Asian or Pacific Islander Pop.	Black Pop.	Percent Black Pop	Hispanic Pop.	Percent Hispanic Pop.	Native American Pop.	Percent Native American Pop.	Other Race	Percent Other Race Pop.	White Pop.	Percent White Pop.
Catawba	2,265,495	597,376	26.4	37,756	1.7	507,810	22.4	40,504	1.8	10,700	0.5	606	0.0	1,668,119	73.6
McGuire	2,575,369	620,701	24.1	43,333	1.7	517,577	20.1	46,486	1.8	12,635	0.5	670	0.0	1,954,668	75.9
North Anna	2,042,200	731,773	35.8	106,086	5.2	508,719	24.9	111,992	5.5	4,976	0.2	1,165	0.1	1,309,262	64.1

**Table M-9. Uncertainties in Estimates of Total and Minority Populations for the Year 2015**

Reactor Site	No. of Partially Included Block Groups	No. of Fully Included Block Groups	T/P	Upper Bound for Total Population	Estimate of Total Population	Lower Bound for Total Population	Upper Bound for Minority Population	Estimate of Minority Population	Lower Bound for Minority Population
Catawba	54 (NC) 52 (SC)	851 (NC) 314 (SC)	11.0	2,395,224	2,265,495	2,191,319	627,435	597,376	579,620
McGuire	64 (NC) 24 (SC)	1,190 (NC) 129 (SC)	15.0	2,672,795	2,575,369	2,513,292	636,842	620,701	611,521
North Anna	84 (VA) 10 (MD)	710 (VA) 5 (MD)	7.6	2,175,504	2,042,200	1,949,928	775,277	731,773	700,983

low-income persons living within 80 km (50 mi) of North Anna in 2015 is 110,531 or 5.4 percent of the projected population. [Text deleted.] Figures M-10 through M-15 show geographical distributions of minority and low-income populations residing within 80 km (50 mi) of the proposed reactor sites.

### **M.7.2 Environmental Effects on Minority and Low-Income Populations Residing Near Proposed Reactor Sites**

The analysis of environmental effects on populations residing within 80 km (50 mi) of the proposed reactor sites is presented in Chapter 4 of the SPD EIS. This analysis shows that no radiological fatalities are likely to result from implementation of the proposed action or alternatives. Radiological risks to the public are small regardless of the racial and ethnic composition of the population, and regardless of the economic status of individuals comprising the population. Nonradiological risks to the general population are also small regardless of the racial and ethnic composition or economic status of the population. Thus, disproportionately high and adverse impacts on minority and low-income populations residing near the various facilities are not likely to result from implementation of the proposed action or alternatives.

### **M.8 REFERENCES**

Campbell, P., 1996, *Population Projections: 1995–2025*, U.S. Department of Commerce, Bureau of the Census, Washington, DC, October.

CEQ (Council on Environmental Quality), 1997, *Environmental Justice, Guidance Under the National Environmental Policy Act*, Executive Office of the President, Washington, DC, December 10.

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